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Tiivistelmä-Referat-Abstract
ABSTRACT The aim of this study is to introduce and apply a statistical method called Multiple Logistic Regression (MLR) for analyzing the differences in the information output of automated weather stations versus a professional observer. Difficult weather periods have been chosen as a base for the analysis, e.g., periods when the temperature is close to zero, the precipitation intensity is very low, or periods with mixed precipitation. This kind of weather events are recognized as an important challenge for the analysis of difficulties and differences in the information output of automated weather stations.

The Present Weather codes are variables of nominal type. The observation error definitions based on differences in the weather codes have been created. The use of Multiple Logistic regression model has been studied when the response variable is an observation error term with two possible outcomes, the determination is true or false. Further, in the last chapter a period with mixed precipitation and with more than two error categories has been studied. All the official weather variables produced by the Finnish Meteorological Institute and also the data from the test sensors were considered as predictor candidates. The difficulties encountered in the automated Present Weather determination have in this study been explained from the point of view of the meteorological and physical sciences. For example, very low intensity of drizzle or solid precipitation combined with a certain wind direction was found to be the explanation for some ‘determination errors’. The dew point temperature was found to be an important predictive variable generally. The method of MLR was proved to be appropriate and accurate for this study and usable for corresponding analysis in the future.

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